

Series 3725
Electropneumatic Positioner
Type 3725



Type 3725 Positioner

Mounting and Operating Instructions

EB 8394 EN

Firmware version 1.10
Edition October 2012



Definition of the signal words used in these mounting and operating instructions



DANGER!

indicates a hazardous situation which, if not avoided, will result in death or serious injury.



NOTICE

indicates a property damage message.



WARNING!

indicates a hazardous situation which, if not avoided, could result in death or serious injury.



Note:

Supplementary explanations, information and tips

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Firmware revisions	
1.02 (old)	1.03 (new)
	Internal revisions
1.03 (old)	1.10 (new)
	Setting of the travel in Code P4 in steps of 0.5 mm
	Monitoring of the end stops only during initialization and in manual mode
	To suppress common-mode interference on the signal lines, the D component of the positioner is switched off when the actuator is at a standstill.

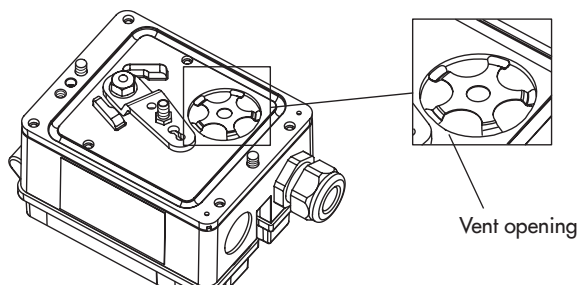
1 Safety instructions

For your own safety, follow these instructions concerning the mounting, start up and operation of the positioner:

- The device is to be assembled, started up or operated only by trained and experienced personnel familiar with the product. According to these mounting and operating instructions, trained personnel is referred to as individuals who are able to judge the work they are assigned to and recognize possible dangers due to their specialized training, their knowledge and experience as well as their knowledge of the applicable standards.
- Explosion-protected versions of this device are to be operated only by personnel who has undergone special training or instructions or who is authorized to work on explosion-protected devices in hazardous areas.
- Any hazards that could be caused in the valve by the process medium, the signal pressure or by moving parts are to be prevented by means of the appropriate measures.
- If inadmissible motions or forces are produced in the pneumatic actuator as a result of the supply pressure level, it must be restricted using a suitable supply pressure reducing station.
- Proper shipping and storage are assumed.

To avoid damage to any equipment, the following also applies:

- Do not operate the positioner with the back of the positioner/vent opening facing upwards. The vent opening must not be sealed when the positioner is installed on site.




Note:

Positioners with a CE marking fulfill the requirements of the Directives 2004/108/EC and 2006/95/EC.

The Declaration of Conformity is available on request.

2 Article code

Positioner	Type 3725-	x	x	x	0	0	0	0	0	0	0	9	9	9
With LCD and autotune, 4 to 20 mA reference variable														
Explosion protection ¹⁾														
Without		0	0	0										
 II 2 G Ex ia IIC T4 acc. to ATEX		1	1	0	0									

¹⁾ Other certification is pending

3 Design and principle of operation

The electropneumatic positioner is mounted on pneumatic control valves and is used to assign the valve position (controlled variable x) to the control signal (reference variable w). The positioner compares the electric control signal of a control system to the travel or opening angle of the control valve and issues a signal pressure (output variable y) for the pneumatic actuator.

The positioner mainly consists of the following components (see Fig. 1):

- Anisotropic magnetoresistive (AMR) sensor (2)
- Analog i/p converter (6) with a downstream air capacity booster (7)
- Electronics unit with microcontroller (4)

The travel or opening angle is measured by the pick-up lever connected to a magnet and a non-contact AMR sensor (2) installed in the positioner and the downstream electronics.

The motion of the pick-up lever causes the direction of the magnetic field to change. This change is sensed by the AMR sensor. The electronics unit determines the current valve position or opening angle from this information.

The position of the valve is transmitted to the microcontroller (4) over its A/D converter (3). The PD control algorithm in the microprocessor compares this actual position to the 4 to 20 mA control signal (reference variable) after it has been converted by the A/D converter (3). In case of a system deviation, the activation of the i/p converter (6) is changed so that

the actuator of the control valve (1) is pressurized or vented accordingly over the downstream booster (7). The supply air is supplied to the booster and the pressure regulator (8).

The output signal pressure supplied by the booster can be limited to 2.4 bar by software.

The volume restriction Q (10) is used to optimize the positioner by adapting it to the actuator size.

Tight-closing function

The pneumatic actuator is completely filled with air or vented as soon as the reference variable falls below 1 % or exceeds 99 % (see end positions set in P10 and P11 parameter codes).

Air to open (ATO): **P10** → ON; **P11** → OFF

Air to close (ATC): **P10** → OFF; **P11** → ON

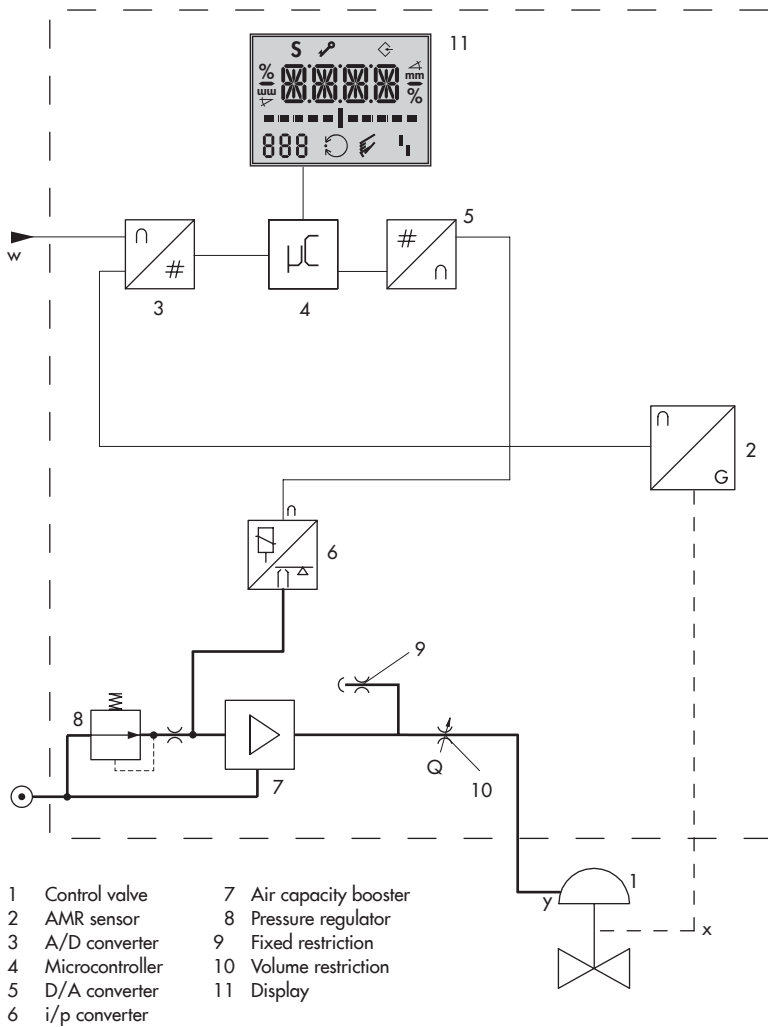



Fig. 1: Functional diagram

3.1 Technical data

Positioner								
Travel, adjustable	Direct attachment to Type 3277: Direct attachment to Type 2780-2: Attachment to Type 3372 Actuator: Attachment according to IEC 60534-6 (NAMUR): Attachment to rotary actuators:	3.75 to 30 mm 6/12/15 mm 15/30 mm 3.75 to 50 mm 24 to 100°						
Reference variable w	4 to 20 mA signal range · Two-wire device with reverse polarity protection Split-range operation 4 to 11.9 mA and 12.1 to 20 mA Static destruction limit 33 V							
Power consumption (start-up)	3.8 mA							
Power consumption (operation)	3.6 mA							
Load impedance	Max. 6.3 V							
Supply air Air quality acc. to ISO 8573-1	Supply air: 1.4 to 7 bar (20 to 105 psi) Max. particle size and density: Class 4 · Oil content: Class 3 · Pressure dew point: Class 3 or at least 10 K below the lowest ambient temperature to be expected							
Signal pressure (output)	0 bar up to the capacity of the supply pressure · Can be limited to approx. 2.4 bar by software							
Characteristic	3 characteristics for globe valves · 9 characteristics for rotary valves							
Hysteresis	≤ 0.3 %							
Sensitivity	≤ 0.1 %							
Transit time	Only for actuators with initialization time > 0.5 s ¹⁾							
Direction of action	w/x reversible							
Air consumption	≤ 100 l _n /h with a supply pressure up to 6 bar and a signal pressure of 0.6 bar							
Air output capacity Actuator filled with air Actuator vented	<table><tr><td>At Δp = 6 bar: 8.5 m_n³/h,</td><td>At Δp = 1.4 bar: 1.4 m_n³/h</td><td>K_{Vmax}(20 °C) = 0.09</td></tr><tr><td>At Δp = 6 bar: 14.0 m_n³/h,</td><td>At Δp = 1.4 bar: 4.5 m_n³/h</td><td>K_{Vmax}(20 °C) = 0.15</td></tr></table>		At Δp = 6 bar: 8.5 m _n ³ /h,	At Δp = 1.4 bar: 1.4 m _n ³ /h	K _{Vmax} (20 °C) = 0.09	At Δp = 6 bar: 14.0 m _n ³ /h,	At Δp = 1.4 bar: 4.5 m _n ³ /h	K _{Vmax} (20 °C) = 0.15
At Δp = 6 bar: 8.5 m _n ³ /h,	At Δp = 1.4 bar: 1.4 m _n ³ /h	K _{Vmax} (20 °C) = 0.09						
At Δp = 6 bar: 14.0 m _n ³ /h,	At Δp = 1.4 bar: 4.5 m _n ³ /h	K _{Vmax} (20 °C) = 0.15						
Permissible ambient temperature	-20 to +80 °C · -25 to +80 °C with metal cable gland The limits in the test certificate additionally apply for explosion-protected versions							
Influences	Temperature: ≤ 0.15 %/10 K Vibrations: ≤ 0.5 % up to 2000 Hz and 4 g according to IEC 770 Supply air: None							

¹⁾ For faster actuators, a volume restriction must be used. Otherwise, the initialization cannot be performed successfully.

Electromagnetic compatibility	Complying with EN 61000-6-2, EN 61000-6-3 and NAMUR Recommendation NE 21
Explosion protection	 II 2 G Ex ia IIC T4
Degree of protection	IP 66
Materials	
Body	Polyphthalamide (PPA)
Cover	Polycarbonate (transparent)
External parts	Stainless steel 1.4571 and 1.4301
Cable gland	M20x1.5, black polyamide
Venting	High-density polyethylene (PE-HD)
Weight	Approx. 0.5 kg

4 Attachment to the control valve – Mounting parts and accessories

NOTICE

Attach the positioner, keeping the following sequence:

1. Mount the positioner on the control valve
2. Connect the supply air
3. Connect the electrical power
4. Perform the start-up settings

The positioner is suitable for the following types of attachment:

- Direct attachment to SAMSON Type 3277 and Type 2780-2 Actuators
- Attachment according to IEC 60534-6 (NAMUR)
- Attachment to Type 3372 Actuator (Series V2001 Valves)
- Attachment to rotary actuators acc. to VDI/VDE 3845

NOTICE

- Attach the positioner to the control valve only using the mounting parts and accessories as described in section 4.5.
- Observe the type of attachment!
- Observe the assignment between lever and pin position!

Lever and pin position

The positioner is adapted to the actuator and to the rated travel by the lever on the back of the positioner and the pin inserted into the lever.

The travel tables show the maximum adjustment range at the positioner. The travel that can be implemented at the valve is additionally restricted by the selected fail-safe position and the required compression of the actuator springs.

The positioner is equipped with the lever M (pin position 35) as standard.

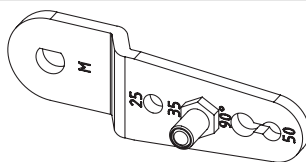


Fig. 2: Lever M with pin position 35

NOTICE

Only remove the lever when it is positioned in the bottom mechanical stop. Otherwise, the internal stops may be damaged.

Removing the lever

1. Hold the lever in place. Undo the nut using a wrench (width across flats SW 10).
2. Remove the lever from the shaft.

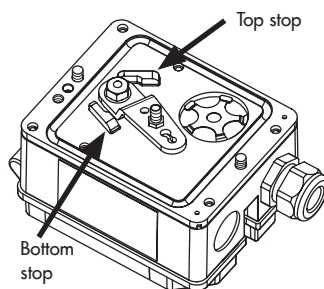


Fig. 3: Mechanical stops for lever

Travel tables

**Note:**

The lever M is included in the scope of delivery.

Direct attachment to Type 3277-5 and Type 3277 Actuators

Actuator size [cm ²]	Rated travel [mm]	Adjustment range at positioner			Required lever	Assigned pin position
		Min.	Travel	Max.		
120	7.5	5.0	to	16.0	M	25
120/240/350	15	7.0	to	22.0	M	35
355/700	30	10.0	to	32.0	M	50

Direct attachment to Type 2780-2 Actuator

Actuator size [cm ²]	Rated travel [mm]	Adjustment range at positioner			Required lever	Assigned pin position
		Min.	Travel	Max.		
120	6/12	5.0	to	16.0	M	25
120	15	7.0	to	22.0	M	35

Attachment according to IEC 60534-6 (NAMUR)

SAMSON Type 3271 Actuator		Travel of other valves [mm]		Required lever	Assigned pin position
Size [cm ²]	Rated travel [mm]	Min.	Max.		
120	7.5	3.5	11.0	S	17
120	7.5	5.0	25.0	M	25
120/240/350	15	7.0	35.0	M	35
700	7.5				
700	15/30	10.0	50.0	M	50

Attachment to rotary actuators acc. to VDI/VDE 3845

Rotary actuators			Required lever	Assigned pin position
Min.	Opening angle	Max.		
24°	to	100°	M	90°

4.1 Direct attachment

4.1.1 Type 3277-5 and Type 2780-2 Actuators

Refer to Table 1 on page 27 for the required mounting parts and accessories.

Observe the travel table on page 13.

Actuator with 120 cm²

Depending on the type of positioner attachment, the signal pressure is routed either left or right of the yoke through a hole to the actuator diaphragm.

Depending on the fail-safe action of the actuator "Actuator stem extends" or "Actuator stem retracts" (valve closes or opens if the supply air fails), the switchover plate (9) must first be attached to the actuator yoke. Align the switchover plate with the corresponding symbol for left or right attachment according to the marking (view looking onto the switchover plate).

1. Mount connecting plate (6) or pressure gauge bracket (7) with pressure gauges onto the positioner, making sure both seal rings (6.1) are seated properly.
2. Screw the screw plug (4) on the back of the positioner into the hole below it (park position) (see Fig. 7) and seal the signal pressure output on the connecting plate (6) or on the pressure gauge bracket (7) with the stopper (5) included in the accessories.
3. Place follower clamp (3) on the actuator stem, align and screw tight so that the

mounting screw is located in the groove of the actuator stem.

4. 1.5 mm travel: Keep the follower pin (2) on lever M (1) on the back of the positioner in the pin position 35 (delivered state).
7.5 mm travel: Remove the follower pin (2) from the pin position 35, reposition it in the hole for pin position 25 and screw tight.
5. Insert formed seal (15) into the groove of the positioner housing.
6. Place positioner on the actuator in such a manner that the follower pin (2) rests on top of the follower clamp (3). While doing this, press on the ribbed area shown in Fig. 4 to lock the pick-up lever in the top position. The lever (1) must rest on the follower clamp with spring force.

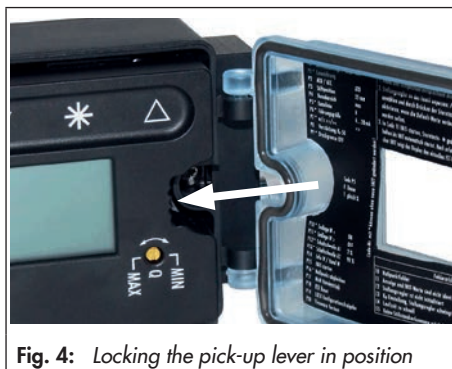


Fig. 4: Locking the pick-up lever in position

Mount the positioner on the actuator using the two fixing screws.

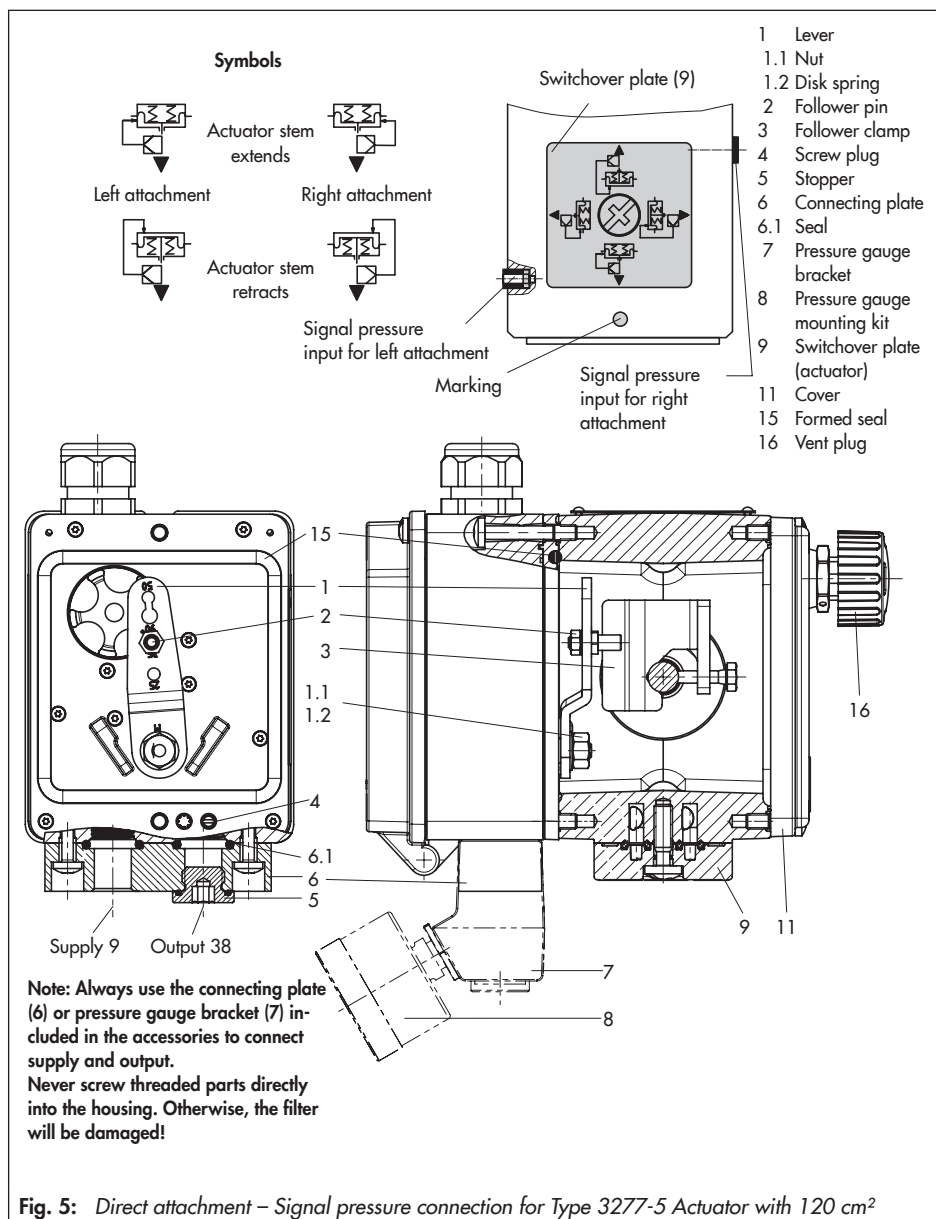
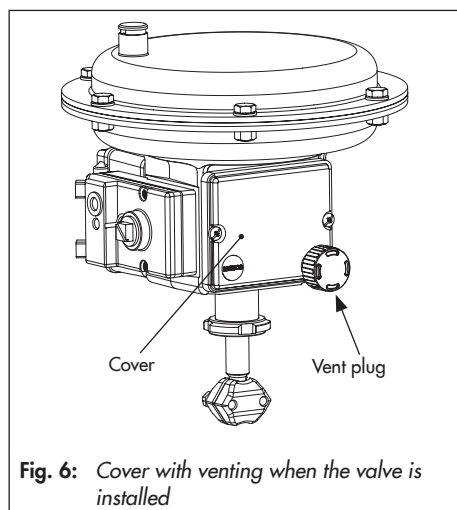


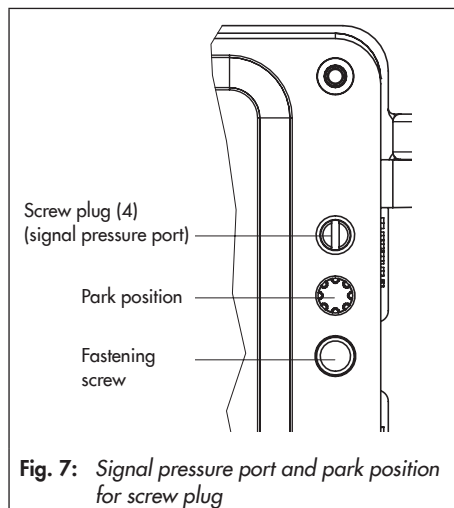
Fig. 5: Direct attachment – Signal pressure connection for Type 3277-5 Actuator with 120 cm²

7. Mount cover (11) on the other side. Make sure that the vent plug is located at the bottom when the control valve is installed to allow any condensed water that collects to drain off (Fig. 6).



Additional solenoid valve

If a solenoid valve is additionally mounted onto the actuator, the signal pressure port at the back of the positioner must be sealed. To do this, unscrew the screw plug located in the middle hole (screw plug in park position) and screw it into the signal pressure port to seal it.



In this case, the signal pressure must be routed from the signal pressure output to the actuator over the connecting plate (6) or pressure gauge bracket (7). The connecting plate (accessories for the actuator) replaces the switchover plate (9).



Note:

The switchover plate or connecting plate are accessories for the actuator (120 cm²) listed in the table on page 27.

4.1.2 Type 3277 Actuator

Refer to section 4.5 for the required mounting parts and accessories.

Observe the travel table on page 13.



Note:

The actuators with 240 to 700 cm² effective areas are described on the following pages.



Fig. 8: Type 3372 Actuator with Type 3725 Positioner (direct attachment)

Actuators with 240 to 700 cm² effective areas

The positioner can be mounted either on the left or right side of the yoke. The signal pressure is routed to the actuator over the connection block (12), for actuators with fail-safe action "Actuator stem extends" internally through a hole in the valve yoke and for "Actuator stem retracts" through an external pipe.

1. Place follower clamp (3) on the actuator stem, align and screw tight so that the mounting screw is located in the groove of the actuator stem.
2. For actuators 240 and 350 cm² with 15 mm travel, keep the follower pin (2) in pin position 35.
For actuators with 355 or 700 cm², remove the follower pin (2) on lever M (1) on the back of the positioner from pin position 35, reposition it in the hole for pin position 50 and screw tight.
3. Insert formed seal (15) in the groove of the positioner housing.
4. Place positioner on the actuator in such a manner that the follower pin (2) rests on top of the follower clamp (3).
While doing this, press on the ribbed area to lock the pick-up lever in the top position (see Fig. 4 on page 14).
The lever (1) must rest on the follower clamp with spring force.
Mount the positioner on the actuator using the two fixing screws.
5. Check to make sure that the tip of the gasket (16) projecting from the side of the connection block (12) is positioned above

the actuator symbol that corresponds with the actuator with fail-safe action "Actuator stem extends" or "Actuator stem retracts". If necessary, remove the three mounting screws and the cover. Then reposition the gasket (16) turned by 180°.

6. Place the connection block (12) with the associated seals against the positioner and the actuator yoke and fasten using the screw (12.1).
For actuators with fail-safe action "Actuator stem retracts", additionally remove the stopper (12.2) and mount the external signal pressure pipe.
7. Mount cover (11) on the other side. Make sure that the vent plug is located at the bottom when the control valve is installed to allow any condensed water that collects to drain off (see Fig. 6 on page 16).

- 1 Lever M
- 1.2 Nut
- 1.2 Disk spring
- 2 Follower pin
- 3 Follower clamp
- 11 Cover
- 12 Connection block
- 12.1 Screw
- 12.2 Stopper or connection for external piping
- 15 Formed seal
- 16 Gasket

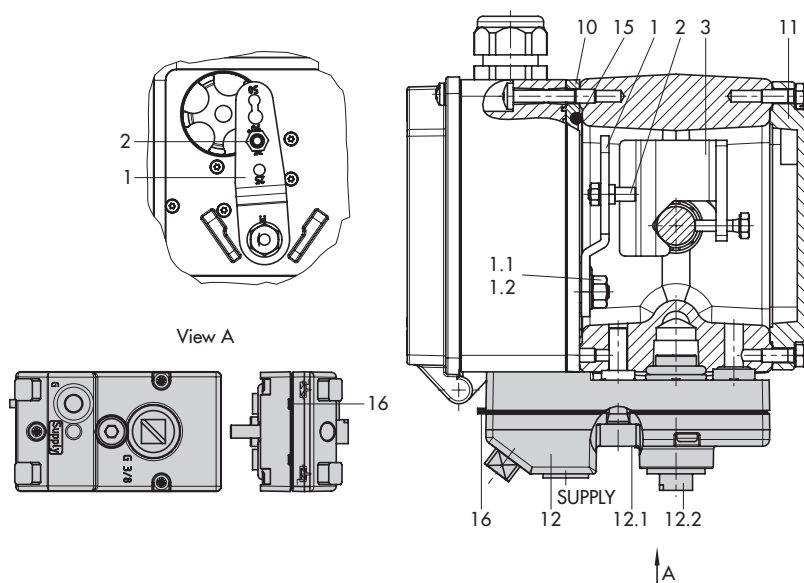


Fig. 9: Direct attachment – Signal pressure connection for Type 3277 Actuator with 240 to 700 cm²

4.2 Attachment according to IEC 60534-6 (NAMUR)

The positioner is attached to the control valve using a NAMUR bracket (10).

Refer to Table 3 on page 27 for the required mounting parts and accessories.

Observe the travel table on page 13.

1. Screw the two bolts (14) to the bracket (9.1) of the stem connector (9), place the follower plate (3) on top and use the screws (14.1) for fastening.
2. Mount NAMUR bracket (10) using the M8 screw (11) and toothed lock washer directly to the yoke hole. Align the NAMUR bracket (10) so that its mounting holes are approximately in line with the middle of the travel scale indicator (15) (the slot of the follower plate must be centrally aligned with the NAMUR bracket at mid valve travel).
3. Mount connecting plate (6) or pressure gauge bracket (7) with pressure gauges (8) on the positioner, making sure the two seals (6.1) are seated properly.
4. Place positioner on the NAMUR bracket in such a manner that the follower pin (2) rests in the slot of the follower plate (3). Adjust the lever (1) correspondingly.
Screw the positioner to the NAMUR bracket using both its mounting screws.

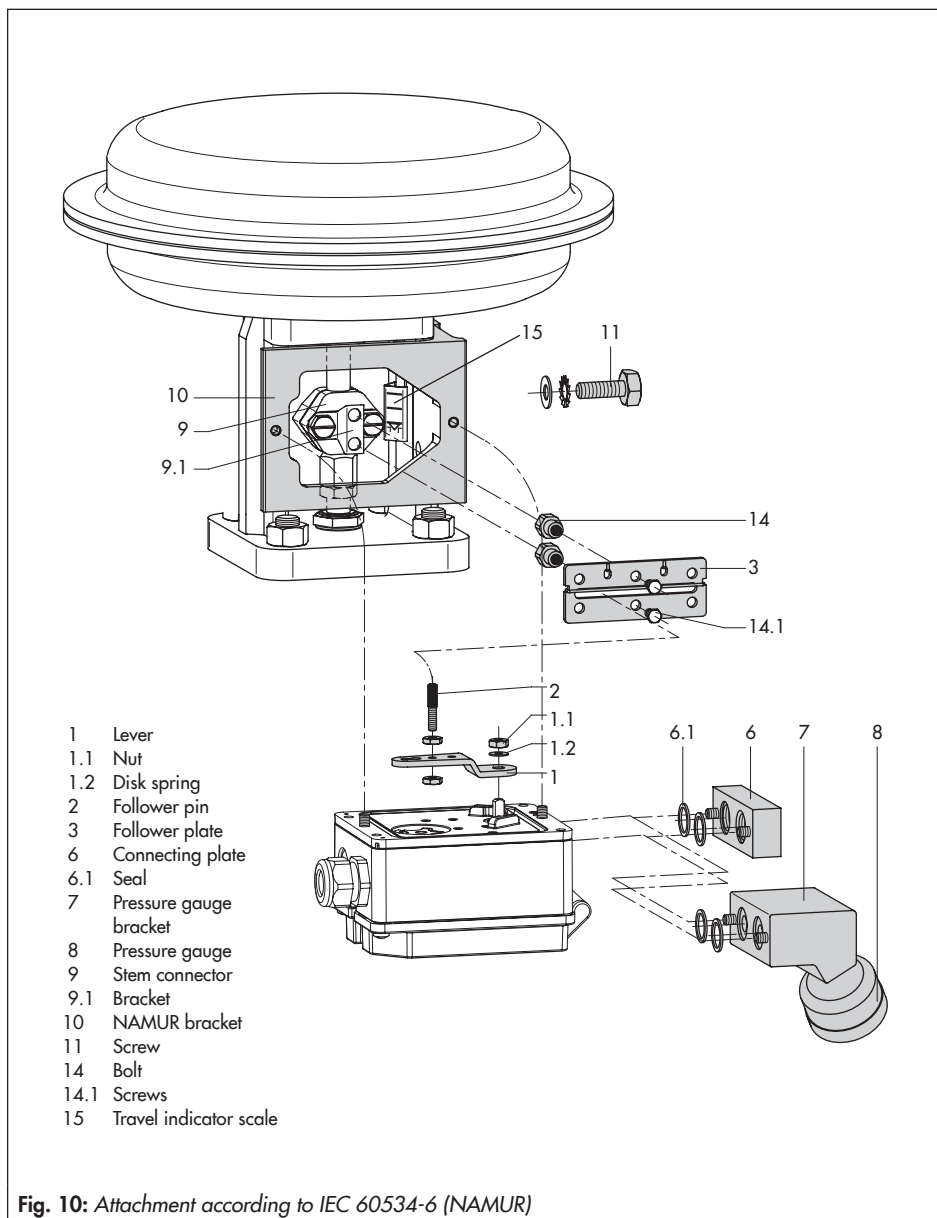


Fig. 10: Attachment according to IEC 60534-6 (NAMUR)

4.3 Attachment to Type 3372 Actuator (V2001)

The Type 3725 Positioner is already included in the scope of delivery for Series V2001 Valves (Type 3372 Actuator).

The attachment is briefly described below to allow conversion work to be performed.

Actuator with 120/350 cm², stem extends

The signal pressure is routed through the corresponding port in the support element to the actuator diaphragm.

Thread the screw plug on the positioner into the hole below (park position) (see Fig. 7 on page 16).

Actuator with 120/350 cm², stem retracts

The signal pressure is routed through piping at the side of the support element to the actuator diaphragm.

Attachment including solenoid valve

The signal pressure is routed from the output port of the positioner to the solenoid valve and through a corresponding hole in the support element to the actuator diaphragm.



Type 3372 Actuator, version 120 cm² effective area



Type 3372 Actuator, version 350 cm² effective area

Fig. 11: Mounting on Type 3372 Actuator

4.4 Attachment to rotary actuators

The positioner is mounted to the rotary actuator using a mounting bracket.

Refer to Table 4 on page 28 for the required mounting parts and accessories.

Before attaching the positioner onto the SAMSON Type 3278 Rotary Actuator (160 cm²) or VETEC Type S160 Actuator, first mount the adapter (13) to the free end of the shaft end using four screws (11, 12).

NOTICE

On attaching the positioner as described below, it is imperative that the actuator's direction of rotation is observed.

1. Place follower clamp (3) on the slotted actuator shaft or adapter (13).
2. Place coupling wheel (4) with flat side facing the actuator on the follower clamp (3). Refer to Fig. 12 to align slot so that it matches the direction of rotation when the valve is in its closed position.
3. Fasten the coupling wheel (4) and follower clamp (3) tightly onto the actuator shaft using screw (4.1) and disk spring (4.2).
4. Mount connecting plate (6) or pressure gauge bracket (7) with pressure gauges (8) on the positioner, making sure the two seals are seated properly.
5. Fasten the mounting bracket (10) to the actuator using four screws (10.1).

6. Unscrew the standard follower pin (2) from the positioner's lever M (1). Use the metal follower pin (\varnothing 5 mm) included in the mounting kit and screw tight into the hole for pin position 90°.
7. Place positioner on the mounting bracket (10) and screw tight. Taking the actuator's direction of rotation into account, adjust lever (1) so that it engages in the slot of the coupling wheel (4) with its follower pin (Fig. 13). It must be guaranteed that the lever (1) is parallel to the long side of the positioner when the actuator is at half its angle of rotation.
8. Stick the scale label on the coupling wheel (4) so that the arrow tip indicates the closed position and it can be easily read when the valve is installed.

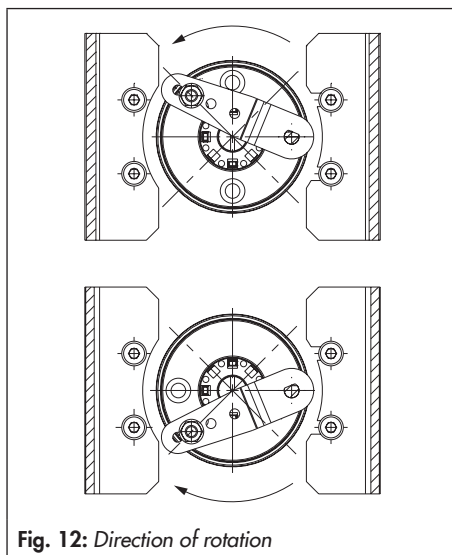
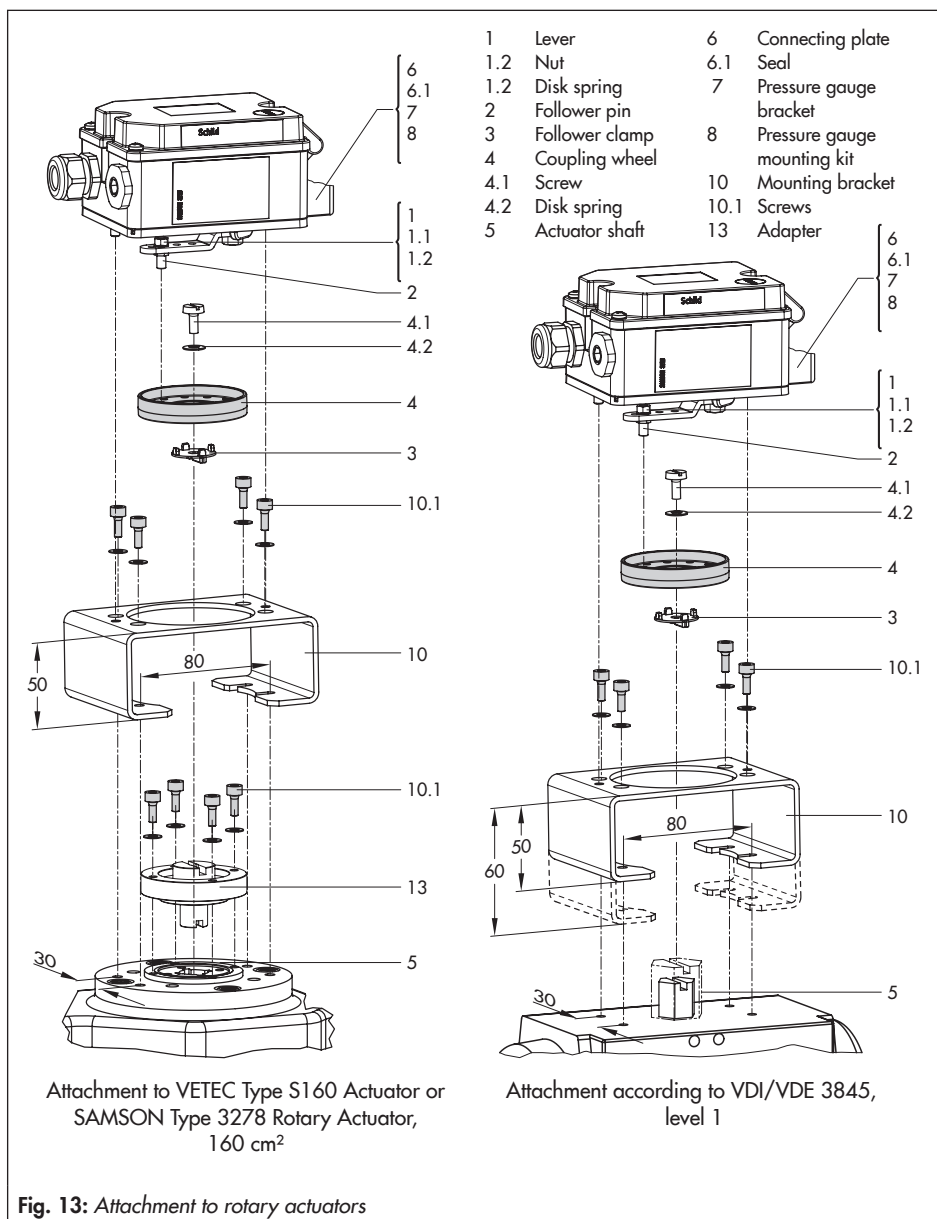


Fig. 12: Direction of rotation



4.4.1 Mounting the Type 3710 Reversing Amplifier

When a Type 3710 Reversing Amplifier is used, a connecting plate must be installed between the positioner and reversing amplifier. The reversing amplifier is fastened to the positioner together with the connecting plate using screws (Fig. 14). Refer to the Mounting and Operating Instructions of the Type 3710 Reversing Amplifier:

► EB 8392 EN

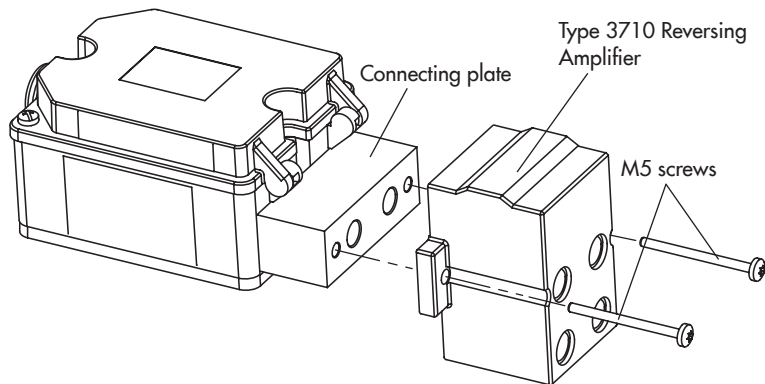


Fig. 14: Mounting the Type 3710 Reversing Amplifier

4.5 Required mounting parts and accessories

Table 1: Direct attachment to Types 3277-5 and 3277 Actuators (section 4.1)			Order no.
Mounting parts	Mounting parts for actuators with 120 cm ² effective area or smaller		1402-0239
Accessories for actuator	Switchover plate for Type 3277-5xxxxxx.01 Actuator		1400-6822
	Connecting plate for additional attachment, e.g. solenoid valve: G 1/8		1400-6820
Accessories for positioner	Connecting plate (6)	G 1/4	1402-0235
		1/4 NPT	1402-0236
	Pressure gauge bracket (7)	G 1/4	1402-0237
		1/4 NPT	1402-0238
	Pressure gauge mounting kit (8), up to max. 6 bar (output/supply)	St. steel/brass	1400-6950
		St. steel/st. steel	1400-6951

Table 2: Direct attachment to Type 3277 Actuator (section 4.1.2)			Order no.
Mounting parts	Attachment to actuators with 240, 350, 355 and 700 cm ²		1402-0240
Accessories	Connection block with seals and screw	G 1/4	1402-0241
		1/4 NPT	1402-0242
	Pressure gauge mounting kit up to max. 6 bar (output/supply)	St. steel/brass	1400-6950
		St. steel/st. steel	1400-6951

Table 3: Attachment to NAMUR ribs according to IEC 60534-6 (section 4.2)			
Travel [mm]	Lever	For actuators	Order no.
3.75 to 50	Without, already on positioner	Actuators from other manufacturers and Type 3271 with 120 to 700 cm ² effective areas	1402-0330
Accessories	Connecting plate	G 1/4	1402-0235
		1/4 NPT	1402-0236
	Pressure gauge bracket	G 1/4	1402-0237
		1/4 NPT	1402-0238
	Pressure gauge mounting kit up to max. 6 bar (output/supply)	St. steel/brass	1400-6950
		St. steel/st. steel	1400-6951

Table 4: Attachment to rotary actuators (section 4.4)		Order no.	
Mounting parts	Attachment acc. to VDI/VDE 3845, size AA1 (see dimension table on page 50)	1402-0243	
	Attachment acc. to VDI/VDE 3845, size AA2 (see dimension table on page 50)	1402-0244	
	Attachment to VETEC Type S160 Actuator or SAMSON Type 3278 Rotary Actuator, 160 cm² (level 2) ¹⁾	1402-0294	
Accessories	Connecting plate	G ¼	1402-0235
		¼ NPT	1402-0236
	Pressure gauge bracket	G ¼	1402-0237
		¼ NPT	1402-0238
	Pressure gauge mounting kit up to max. 6 bar (output/supply)	St. steel/brass	1400-6950
		St. steel/st. steel	1400-6951
Connecting plate for Type 3710 Reversing Amplifier		1402-0512	

¹⁾ Refer to section 11.1 on page 50 for details

Table 5: General accessories		Order no.
Plastic cable gland, M20x1.5	Black	8808-1011
	Blue	8808-1012
	Nickel-plated brass	1890-4875
	Stainless steel 1.4305	8808-0160
Adapter M20x1.5 to 1/2 NPT	Powder-coated aluminum	0310-2149
	Stainless steel	1400-7114
Brief instructions inside cover	DE/EN (delivered state)	0190-6173/ 0190-6174

5 Connections

5.1 Pneumatic connections

! NOTICE

The threaded connections in the positioner housing are not designed for the direct connection of pneumatic fittings!

The screw fittings must be screwed into the connecting plate, the pressure gauge mounting block or the connection block from the accessories. Their pneumatic connections are optionally designed as a bore with 1/4 NPT or G 1/4 thread. The customary fittings for metal and copper pipes or plastic hoses can be used.

Keep the length of the line as short as possible to avoid delays in control signal transmission.

! NOTICE

*The supply air must be dry and free from oil and dust. The maintenance instructions for upstream pressure reducing stations must be observed.
Blow through all air pipes and hoses thoroughly prior to connecting them.*

The signal pressure connection is fixed when the positioner is directly attached to the Type 3277 Actuator.

For attachment according to IEC 60534-6 (NAMUR), the signal pressure can be routed to either the top or bottom diaphragm chamber of the actuator, depending on the actua-

tor's fail-safe action "Actuator stem extends" or "Actuator stem retracts".

For rotary actuators, the manufacturer's specifications for connection apply.

5.1.1 Signal pressure gauges

To monitor the supply air (supply) and signal pressure (output), we recommend mounting pressure gauges (see accessories in section 4.5).

5.1.2 Supply pressure

The required supply air pressure depends on the bench range and the actuator's operating direction (fail-safe action). The bench range is registered on the nameplate either as spring range or signal pressure range depending on the actuator. The direction of action is marked FA or FE, or by a symbol.

Actuator stem extends FA (air to open)

Fail-safe position "Valve Closed" (for globe and angle valves):

Required supply pressure = Upper bench range value + 0.2 bar, minimum 1.4 bar.

Actuator stem retracts FE (air to close)

Fail-safe position "Valve Open" (for globe and angle valves):

For tight-closing valves, the maximum signal pressure $p_{st_{max}}$ is roughly estimated as follows:

$$p_{st_{max}} = F + \frac{d^2 \cdot \pi \cdot \Delta p}{4 \cdot A} \text{ [bar]}$$

d = Seat diameter [cm]

Δp = Differential pressure across the valve [bar]

A = Actuator diaphragm area [cm²]

F = Upper bench range value [bar]

If there are no specifications, calculate as follows:

Required supply pressure = Upper bench range value + 1 bar



Note:

The signal pressure at the output (38) of the positioner can be restricted to approx. 2.4 bar by setting **P9** parameter code to ON.

5.2 Electrical connections



DANGER!

Risk of electric shock and/or the formation of an explosive atmosphere!

- For electrical installation, observe the relevant electrotechnical regulations and the accident prevention regulations that apply in the country of use. The following regulation applies to mounting and installation in hazardous areas: EN 60079-14: **Explosive atmospheres – Part 14: Electrical installations design, selection and erection.**
- Avoid electrostatic charging of the plastic housing when mounting and servicing the positioner in hazardous areas.



NOTICE

- Do not loosen enameled screws in or on the housing.
- The maximum permissible values (U_i , I_i , P_i , L_i and C_i) specified in the EC-type examination certificate apply when interconnecting intrinsically safe electrical equipment).



NOTICE

Only a current source must be used for the electrical supply. Do not use a voltage source!

Selecting cables and wires

Observe EN 60079-14 and particularly Clause 12 in it when installing intrinsically safe circuits.

The Subclause 12.2.2.7 applies when running multi-core cables containing more than one intrinsically safe circuit.

The minimum radial thickness of the conductor insulation must be suitable for the conductor diameter and type of insulation. It must be at least 0.2 mm.

The diameter of an individual wire in a fine-stranded conductor must not be smaller than 0.1 mm.

Protect the conductor ends against splicing, e.g. by using wire-end ferrules.

Equipment for use in zone 2

In equipment operated with type of protection Ex nA (non-sparking equipment) according to EN 60097-15, circuits may be connected, interrupted or switched while energized only during installation, maintenance or repair.

Cable entry

The M20 x 1.5 cable gland is designed for a clamping range of 6 to 12 mm.

The cage clamp terminals hold wire cross-sections of 0.2 to 1.5 mm² and additionally have test connections for 1 mm probe tips.

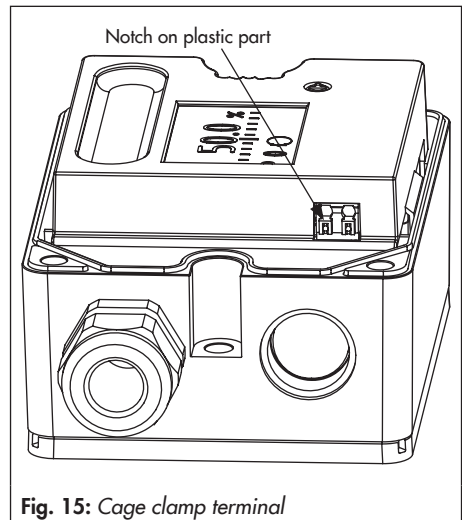


Fig. 15: Cage clamp terminal

! NOTICE

Applying excessive force to the cage clamp terminals may damage them.

The test connections are also used to unlock the cage clamp terminals: place a slotted screwdriver on the notch of the plastic part of the test connection (Fig. 15) and press down, while inserting or removing the wire.

The wires for the reference variable must be connected to the terminals 11 and 12 located in the housing.

! NOTICE

The static destruction limit of the positioner is at ± 33 V. Do not allow the input signal to fall below the lowest permissible value of 3.8 mA for positioner operation.

Accessories:

Plastic cable gland, M20 x 1.5

- Black Order no. 8808-1011
- Blue Order no. 8808-1012
- Nickel-plated brass Order no. 1890-4875
- Stainless steel 1.4305 Order no. 8808-0160

Adapter M20x1.5 to ½ NPT

- Powder-coated aluminum Order no. 0310-2149
- Stainless steel Order no. 1400-7114

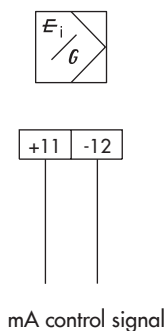


Fig. 16: *Electrical connections*

6 Operation


Three capacitive keys and a LCD are used to operate the positioner (see below).

To adapt the air capacity, the volume restriction must be adjusted (section 7.3).

6.1 Operating controls

Touch ▽ or ▲ to select a parameter code (P0 to P20). Then touch ✱ to confirm the selected code.

! NOTICE

Any parameter code settings that have been changed are first saved in a non-volatile memory after the display has returned to the display with status indication. Go to Code P0 by touching ▽ or ▲ or wait three minutes until the display returns automatically. The  icon on the display indicates that the changed parameter settings have not yet been saved in the non-volatile memory.



Note:

After changing settings in P2, P3, P4, P8 and P9 parameter codes, the positioner must be re-initialized.

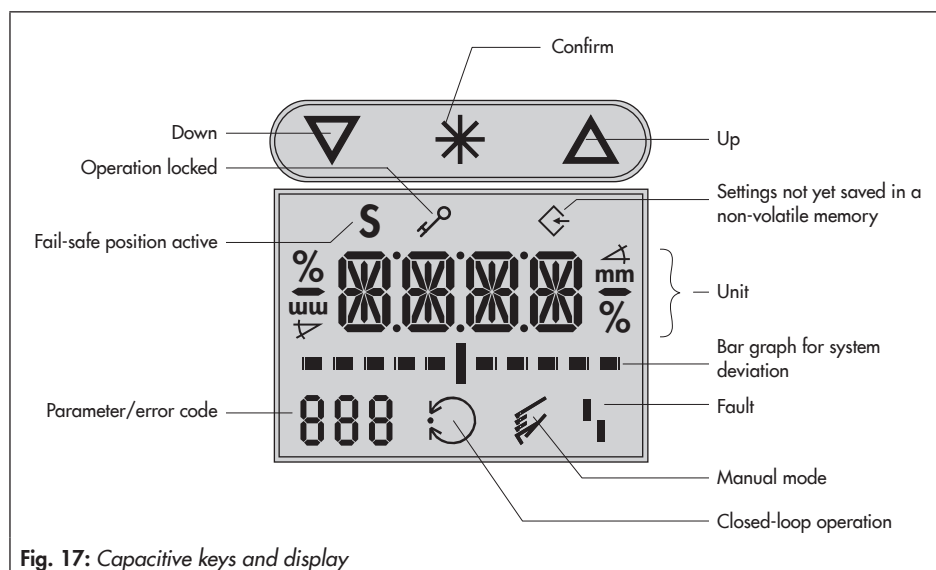


Fig. 17: Capacitive keys and display

Volume restriction Q

The volume restriction serves to adapt the air output capacity to the size of the actuator. Two fixed settings are possible (refer to section 7.3).




Display

Display	Meaning
ESC	Cancel
Err	Error
LOW	w too low
MAN	Manual mode
MAX	Maximum range
RST	Reset
INIT	Initialization
ON/OFF	Activated/deactivated
ZERO	Zero calibration

Icons assigned to certain codes and functions are indicated on the display. The bar elements indicate the system deviation that depends on the sign (+/-) and the value.

One bar element appears per 1 % system deviation.

If the positioner has not yet been initialized, the lever position in degrees in relation to the longitudinal axis is indicated. One bar element corresponds to approximately a 7° angle of rotation.

If the fault indication icon  appears on the display, touch  or  until **ERR** appears on the display to view the **E0** to **E15** error code(s) (see code list in section 8).

7 Start-up and settings



WARNING!

Do not perform a start-up while the process is running. On applying supply air and the electric control signal, the control valve may move through its entire travel range/rotational angle range depending on the setting.

- Connect the supply air (Supply 9).
- Connect the 4 to 20 mA signal (terminals +11/-12).



Note:

After connecting the electrical signal (power supply), the positioner performs a calibration of the capacitive keys which takes approx. three seconds. During this time, do not touch the key panel. Otherwise, the keys will not work properly. Disconnect and reconnect the electrical signal to restart the calibration of keys.

LOW on the display indicates that the reference variable is lower than 3.6 mA.

The positioner is ready for operation with its default settings for most applications, provided it has been mounted properly.

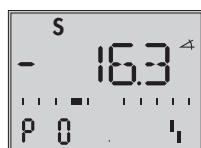


Note:

The positioner needs to be initialized again after the position of the volume restriction has been changed. The positioner also needs to be initialized again after the setting for the fail-safe position has been changed.

Reading after connecting the electrical signal

The **I** fault indication icon and und **S** (fail-safe position) appear on the display when the positioner has not yet been initialized. The reading indicates the lever positioner in degrees relative to the longitudinal axis.



Reading when the positioner has not yet been initialized

- Code **P0** appears on the display after connecting the electrical signal to an initialized positioner.

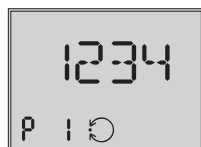
7.1 Adapting the display direction

The data representation on the positioner display can be turned by 180°.

If the displayed data appear upside down, proceed as follows:

Touch **▽** or **△** until Code **P1** appears.

Touch **✱** to confirm the selected code. **P1** blinks.



Reading direction for right attachment of pneumatic connections

Touch **▽** or **△** until the display is set in the desired direction.

Touch **✱** to confirm display direction.

7.2 Enabling configuration



Note:

Before changing parameter settings, configuration must be enabled first by selecting Code **P19**.



Enabling configuration with Code 19

If no settings are entered within three minutes, the enabled configuration function becomes invalid. Touch **▽** or **△** until Code **P19** appears.

Touch **✱** to confirm the selected code. **P19** blinks.

Touch **△** until OPEN appears on the display.

Touch **✱** to unlock operation.



NOTICE

During start-up, the actuator stem moves.

Do not touch the actuator stem or obstruct it to avoid risk of injury to hands or fingers.

The permissible range has been exceeded when the displayed angle is more than 30°.

The positioner goes to the fail-safe position (SAFE).

Make sure that the lever and pin position match the details as described in section 4.



Note:

The positioner has a function to monitor the working range.

If the lever moves too close to the mechanical stops (risk of mechanical damage), the positioner vents the actuator and the valve moves to its fail-safe position (**S** displayed together with **E8** error code).

In this case, check the positioner attachment. Reset the displayed error code by selecting **RST** (see section 7.11).

7.3 Adjusting the volume restriction Q



Fig. 18: Volume restriction Q
MAX/MIN setting

The volume restriction Q serves to adapt the air output capacity to the size of the actuator:

- Actuators with a **transit time < 1 s**, e.g. linear actuators with an effective area smaller than 240 cm², require a restricted air flow rate.
Setting to MIN
- Actuators with a **transit time ≥ 1 s** do not require the air flow rate to be restricted.
Setting to MAX

Intermediate settings are not permitted.



NOTICE

The positioner needs to be initialized again after the position of the restriction has been changed.

7.4 Entering the opening direction/direction of action

- AIR TO OPEN (ATO) applies to a valve opening as the signal pressure increases.
- AIR TO CLOSE (ATC) applies to a valve closing as the signal pressure increases.

The signal pressure is the pneumatic pressure at the output of the positioner applied to the actuator.

Enable configuration (section 7.2).



Default ATO

Touch ▽ or ▲ until Code **P2** appears.

Touch ✱ to confirm selected code. **P2** blinks.

Touch ▽ or ▲ until the required fail-safe position appears.

Touch ✱ to confirm setting.



Note:

The changed opening direction/direction of action first becomes effective after the positioner has been re-initialized.

7.5 Entering the direction of action

The direction of action (P7) is set to increasing/increasing by default.

For checking purposes:

After successfully completing initialization, the positioner display should read 0 % when the valve is closed and 100 % when the valve is open.

If necessary, the direction of action can be changed either before or after initialization.

The following correlation applies:

Valve		CLOSED	OPEN
Reading		0 %	100 %
ATO	>>	4 mA	20 mA
	<<	20 mA	4 mA
ATC	>>	4 mA	20 mA
	<<	20 mA	4 mA

>> Increasing/increasing

<< Increasing/decreasing

7.6 Limiting the signal pressure

If the maximum actuator force may cause damage to the valve, the signal pressure must be limited. Set Code **P9** to ON. This limits the signal pressure to approx. 2.4 bar.

Enable configuration at the positioner before activating the pressure limit function (see section 7.2).

7.7 Setting other parameters

The following table lists all the parameter codes and their default settings. If you want to change the default setting of a parameter, proceed in the same manner as previously described.



Note:

The selected parameter code remains active until you change the setting or exit the parameter code.

More details concerning the parameter codes can be found in section 8.

Parameter codes [Default setting] Codes marked with * indicate that the positioner needs to be re-initialized afterwards	
P17	Manual mode
P18	Reset
P19	Enable configuration
P20	Read firmware

Parameter codes [Default setting] Codes marked with * indicate that the positioner needs to be re-initialized afterwards	
P0	Operation
P1	Reading direction
P2*	Fail-safe position [ATO]
P3*	Pin position [35]
P4*	Nominal range [MAX]
P5	Characteristic [1]
P6	Reference variable [4 to 20 mA]
P7	w/x direction of action [>>]
P8*	Gain Kp [50]
P9	Pressure limit 2.4 bar [OFF]
P10	End position w < [ON]
P11	End position w > [OFF]
P14	Display of reference variable w
P15	INIT Start initialization
P16	ZERO Start zero calibration

7.8 Initialization

During initialization the positioner adapts itself optimally to the friction conditions and the signal pressure required by the control valve.



WARNING!

During the initialization, the control valve moves through its entire travel range/angle of rotation.

Therefore, do not start initialization while a process is running, but only during start-up, when all shut-off valves are closed.

The type and extent of self-adaptation depends on the preset parameters.

MAX is the default setting for the nominal range (Code **P4**).

During the initialization process, the positioner determines the travel range/angle of rotation of the valve (from the CLOSED position to the other end position).

Alternatively, a different travel can be selected in Code **P4** (see code list in section 8).



Note:

*The travel set in Code **P4** is only limited during initialization. However, it might be exceeded in closed-loop control when the control signal is higher than 20 mA.*

Start initialization by activating Code **P15** as follows:



Touch ▽ or ▲ to select Code **P15**.

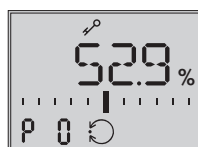
Touch ✱ six seconds long. **6-5-4-3-2-1-** is counted down on the display.

Initialization starts. INIT blinks on the display!




Note:

The time required for the initialization procedure depends on the actuator transit time and can take a few minutes.



Initialization successfully completed, positioner runs in closed-loop operation

After a successful initialization, the positioner runs in closed-loop operation indicated by the  closed-loop operation icon and control position in % predetermined by the reference variable on the display. Configuration is locked.

A malfunction leads to the process being interrupted and the positioner moving to the fail-safe position. The fault indication icon appears on the display. Refer to section 7.12.



Initialization canceled

Canceling initialization

The initialization can be canceled by touching ✱.



- ESC blinks on the display.
- Touch ✱ to confirm.



Note:

This code must be confirmed by touching ✱. Otherwise, the code remains active.

Case 1: A positioner that has not yet been initialized goes to the fail-safe position after the initialization process has been canceled.

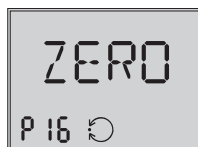
Case 2: The initialized positioner goes to AUTO mode after the re-initialization process has been canceled. The settings of the previous initialization are used.

A new initialization can be started directly afterwards.

7.9 Zero calibration

In case of inconsistencies in the closing position of the valve, e.g. with soft-seated plugs, it might be necessary to recalibrate zero. Enable configuration as described in section 7.2.

Start the zero calibration by activating Code **P16** as follows:



Touch ▽ or ▲ until Code **P16** appears.

Touch ✱ six seconds long. **6-5-4-3-2-1-** is counted down on the display.

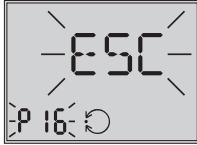
Zero calibration starts, the display blinks!

The positioner moves the control valve to the CLOSED position and recalibrates the internal electric zero point.

When the zero calibration has been successfully completed, the positioner returns to closed-loop operation (display with status indication).

Canceling zero calibration

The zero calibration can be canceled by touching *****.



- ESC blinks on the display.
- Touch ***** to confirm.



Note:

*This code must be confirmed by touching *****. Otherwise, the code remains active.*

The positioner returns to closed-loop operation without performing a zero calibration.

A new zero calibration can be started directly afterwards.

7.10 Manual mode

The valve position can be moved as follows using the *Manual mode* function:

Enable configuration (section 7.2).

Touch **▽** or **△** until Code **P17** appears.

Touch ***** six seconds long. **6-5-4-3-2-1-** is counted down on the display.

P17 blinks.

The manual set point (w man) is indicated on the display of an initialized positioner.



The lever position in degrees in relation to the longitudinal axis is indicated on the display of a positioner that has not been initialized.



Touch **▽** or **△** to change the manual set point.

Initialized positioner

The manual mode starts using the last set point of the automatic mode, ensuring a bumpless changeover.

The bar elements on the display indicate the system deviation between the manual and automatic set point while manually moving the valve in Code **P17**.

The manual set point is adjusted in steps of 0.1 %. You can move the valve controlled within its range.

Positioner that has not yet been initialized

Touch ▽ or ▲ longer to move the valve manually.

The valve is only moved in one direction uncontrolled. The bar elements on the display indicate the change in direction.

Touch ✱ to deactivate the *Manual mode* function.



Note:

The Manual mode function can only be exited as described or by interrupting the electrical supply (cold start). The positioner does not automatically exit this function and return to the display with status indication.

7.11 Reset

The positioner is in closed-loop operation after the initialization has been successfully completed.

A reset causes an initialization to be undone and all parameters settings are reset to the default settings (see code list in section 8).

Enable configuration (section 7.2).

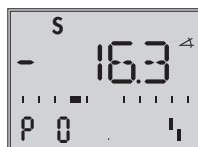
Touch ▽ or ▲ until Code **P18** appears.

Touch ✱ six seconds long. **6-5-4-3-2-1-** is counted down on the display.


RST blinks.





After the positioner has been reset, the display automatically returns to status indication (PO). In this display, the angle is indicated in degrees relative to the longitudinal axis.



7.12 Faults

On the occurrence of a fault, the fault indication icon  appears at the bottom of the display.

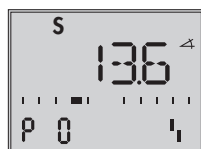
If the fault indication icon appears after a parameter code setting has been changed, this indicates that this setting does not match the values determined during initialization. See Code **E1** (see code list in section 8).

Touch  or  past Code **P0** or **P20**, the respective error code **E0** to **E15** together with **ERR** appear on the display.

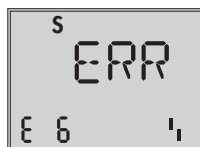
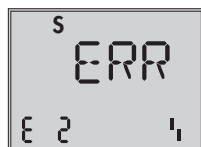
Refer to the code list for the cause of the errors and the recommended action.

Example:

If, for instance, a travel has been entered in Code **P4** (nominal range) which is larger than the maximum valve travel possible, the initialization process would be interrupted (**E2** error code) because the rated travel would not have been reached (**E6** error code). The valve moves to the fail-safe position (**S** indicated on the display).



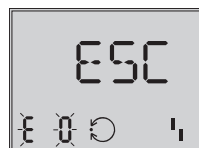
Display of the fault indication






The nominal range (Code **P4**) must be changed and the positioner re-initialized to remedy this problem.

Reset error codes


The **E0** and **E8** error codes can be reset as follows:




Touch  or  until the error code appears.

Touch  to confirm the error code. **ESC** appears on the display.

Touch  or  until RST appears.

Touch  six seconds long. **6-5-4-3-2-1-** is counted down on the display.

Touch  to reset the error.

The reset procedure can be canceled by touching  when **ESC** appears.

8 Code list

Code	Display, values [default setting]	Description																
Parameter codes · Codes marked with * indicate the positioner needs to be re-initialized afterwards																		
P0		Status indication mode of the display showing basic information The reading indicates the valve position or the angle of rotation in % when the positioner is initialized. The position of the lever in relation to the mid-axis is indicated in degrees when * is touched and the positioner has not yet been initialized.																
P1	Reading direction	The reading direction of the display is turned by 180°.																
P2*	ATO / ATC [ATO]	Parameter to adapt the positioner to how the control valve functions: ATO – Air to open (valve CLOSED in fail-safe position) ATC – Air to close (valve OPEN in fail-safe position)																
P3*	Pin position 17/25/[35]/50/90°	The follower pin must be mounted in the proper position depending on the valve travel/opening angle. (select according to the travel tables on page 13).																
P4*	Nominal range [MAX] Values with default setting [35]: e.g. 7.5/8.92/10.6/12.6/ 15.0/17.8/21.2 mm	Firmware 1.03 and lower: The possible adjustment range can be selected in stages depending on the selected pin position: <table><tr><td>17</td><td>3.75</td><td>to</td><td>10.6 mm</td></tr><tr><td>25</td><td>5.3</td><td>to</td><td>15.0 mm</td></tr><tr><td>35</td><td>7.5</td><td>to</td><td>21.2 mm</td></tr><tr><td>50</td><td>10.6</td><td>to</td><td>30.0 mm</td></tr></table> For 90° Maximum range only, if P3 = 90° MAX Maximum possible travel	17	3.75	to	10.6 mm	25	5.3	to	15.0 mm	35	7.5	to	21.2 mm	50	10.6	to	30.0 mm
	17	3.75	to	10.6 mm														
25	5.3	to	15.0 mm															
35	7.5	to	21.2 mm															
50	10.6	to	30.0 mm															
	Nominal range [MAX]	Firmware 1.10 and higher: The possible adjustment range can be selected in steps of 0.5 mm depending on the selected pin position: <table><tr><td>17</td><td>3.5</td><td>to</td><td>11.0 mm, alternatively MAX</td></tr><tr><td>25</td><td>5.0</td><td>to</td><td>16.0 mm, alternatively MAX</td></tr><tr><td>35</td><td>7.0</td><td>to</td><td>22.0 mm, alternatively MAX</td></tr><tr><td>50</td><td>10.0</td><td>to</td><td>32.0 mm, alternatively MAX</td></tr></table> For 90° Maximum range only, if P3 = 90° MAX Maximum possible travel	17	3.5	to	11.0 mm, alternatively MAX	25	5.0	to	16.0 mm, alternatively MAX	35	7.0	to	22.0 mm, alternatively MAX	50	10.0	to	32.0 mm, alternatively MAX
17	3.5	to	11.0 mm, alternatively MAX															
25	5.0	to	16.0 mm, alternatively MAX															
35	7.0	to	22.0 mm, alternatively MAX															
50	10.0	to	32.0 mm, alternatively MAX															

P5	Characteristic 0 to 8 [1]	Characteristic selection: 0, 1, 2 for globe valves, 0 to 8 with rotary actuators ($P3 = 90^\circ$) 0 Linear 1 Equal percentage 2 Reverse equal percentage 3 SAMSON butterfly valve, linear 4 SAMSON butterfly valve, equal percentage 5 VETEC rotary plug valve, linear 6 VETEC rotary plug valve, equal percentage 7 Segmented ball valve, linear 8 Segmented ball valve, equal percentage
P6	Reference variable [4 to 20 mA] SRLO/SRHI	For split-range operation: SRLO : low range 4 to 11.9 mA SRHI : high range 12.1 to 20 mA
P7	w/x [>>]/<>	Direction of action of the reference variable w to the travel/rotational angle x (increasing/increasing or increasing/decreasing)
P8*	Gain K_p 30/[50]	On initializing the positioner, the gain is set to the selected value. If the positioner hunts, the K_p value can be reduced. The positioner must be then re-initialized afterwards.
P9	Pressure limit ON/[OFF]	The signal pressure can take on the same pressure as the supply air at the maximum [OFF] or, in the case that the maximum actuator force can damage the valve, the pressure is limited to approx. 2.4 bar.
P10	End position w < [ON]/OFF	Lower tight-closing function: If w reaches up to 1 % towards the final value that causes the valve to close, the actuator is immediately completely vented (with ATO - air to open) or filled with air (with ATC - air to close).
P11	End position w > ON/[OFF]	Upper tight-closing function: If w reaches up to 99 % towards the final value that causes the valve to open, the actuator is immediately completely filled with air (with ATO - air to open) or vented (with ATC - air to close).
P14	Info w Initialized Not initialized	Indicates the internally adjusted set point (adjusted set point in 0 to 100 % according to the settings in P6 and P7). Touch * to display external set point (applied set point in 0 to 100 % according to the 4-20 mA signal). Displays external set point in 0 to 100 % according to the 4-20 mA signal.

P15	Start initialization	The initialization process can be interrupted by touching * . The control valve moves to its fail-safe position. After a power supply failure during initialization, the positioner starts with the settings from the last initialization (if they exist).
P16	Start zero calibration	The zero calibration process can be interrupted by touching * . The control valve returns to closed-loop operation. Note: A zero calibration cannot be started when E1 error code exists. After a power supply failure during zero calibration, the positioner starts with the settings from the last zero calibration.
P17	Manual mode ¹⁾	Touch ▽ or △ to enter the set point.
P18	Reset	Parameters are reset to their default setting. The positioner can only return to closed-loop operation after it has been re-initialized.
P19	Enable configuration [LOCK]/OPEN	Enable configuration to change parameter settings. This function is automatically canceled when none of the keys are touched within three minutes.
P20	Read firmware	Installed firmware version is displayed. Touch * to display the last four digits of the serial number.
Error codes		
E0	Zero error (operational error)	Only with tight-closing function P10 w < set to ON The zero point has shifted by more than 5 % compared to initialization. The error may arise when the mounting position/linkage of the positioner moves or when the valve seat trim is worn, especially with soft-seated plugs.
	Recommended action	Check valve and positioner attachment. If OK, perform a zero calibration over Code P16 (see section 7.9) or reset the error code (see section 7.12).
E1	Displayed and INIT values are not identical (operational error)	Parameter code settings were changed after the initialization.
	Recommended action	Reset parameters or perform initialization.
E2	Positioner has not been initialized	
	Recommended action	Set parameters and initialize the positioner over Code P15 .

¹⁾ Also not available when the positioner has not been initialized

E3	K_p setting (initialization error)	Positioner hunts. Volume restriction set incorrectly, too much gain.
	Recommended action	Check the volume restriction setting as described in section 7.3. Limit gain K _p in Code P8. Re-initialize the positioner.
E4	Transit time is too fast (initialization error)	The transit times of the actuator determined during initialization are so short (below 0.5 second) that the optimal positioner tuning is not possible.
	Recommended action	Check the volume restriction setting as described in section 7.3. Re-initialize the positioner.
E5	Standstill detection is not possible (initialization error)	Supply pressure is too low or varies. Mounting incorrect.
	Recommended action	Check supply air and positioner mounting. Re-initialize the positioner.
E6	Travel is not achieved during initialization (initialization error)	Supply pressure is too low, actuator leaks, incorrect travel adjusted or pressure limit function activated.
	Recommended action	Check supply air, positioner mounting and setting. Re-initialize the positioner.
E7	Actuator does not move (initialization error)	No supply air, mounting blocked.
	Recommended action	Check supply air, positioner mounting and mA input signal. Re-initialize the positioner.
E8	Travel signal at lower/upper limit	Wrong pin position, wrong lever, wrong attachment direction when NAMUR attachment is used.
	Recommended action	Reset error code (see section 7.12). Check positioner mounting and re-initialize the positioner.
E9 to E15	Device error	Internal device error
	Recommended action	Return positioner to SAMSON AG for repair.

9 Maintenance

The positioner does not require any maintenance.

There are filters with a 100 µm mesh size in the pneumatic connections for supply and output which can be removed and cleaned, if required.

The maintenance instructions of any upstream supply air pressure reducing stations must be observed.



Note:

Devices that have already been used outside hazardous areas and are intended for future use inside hazardous areas must comply with the safety requirements placed on serviced devices. Before being operated inside hazardous areas, test the devices according to the specifications for servicing explosion-protected devices.

10 Servicing explosion-protected devices

If a part of the device on which the explosion protection is based needs to be serviced, the device must not be put back into operation until an approved notified body or a qualified inspector has assessed it according to explosion protection requirements, has issued an inspection certificate or given the device a mark of conformity.

Inspection by an approved notified body or a qualified inspector is not required if the manufacturer performs a routine test on the device prior to putting it back into operation. The passing of the routine test must be documented by attaching a mark of conformity to the device.

Replace explosion-protected components only by original, routine-tested components provided by the manufacturer.

11 Dimensions in mm

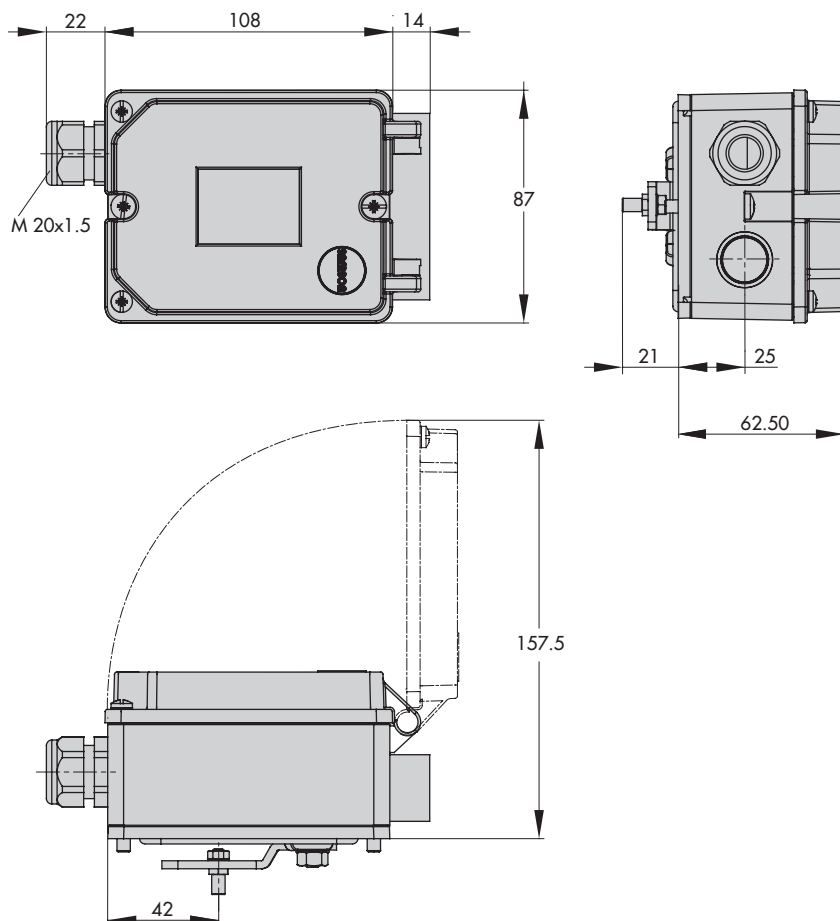
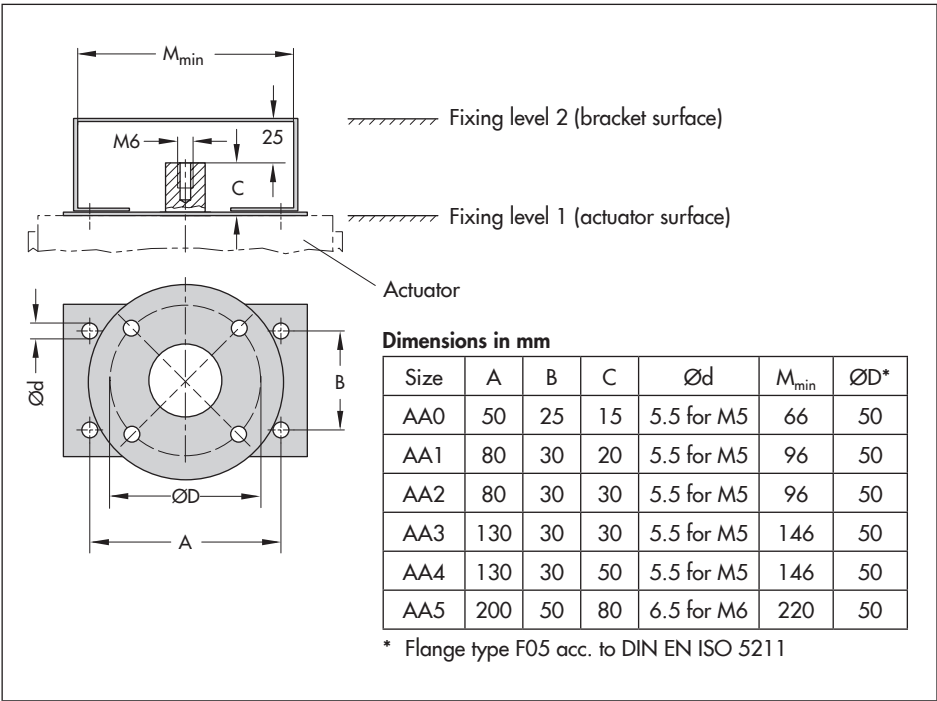


Fig. 19: Dimensional drawings for Type 3375 Positioner

11.1 Fixing levels according to VDI/VDE 3845 (September 2010)





EC-TYPE-EXAMINATION CERTIFICATE

(Translation)

- (1) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres - **Directive 94/9/EC**
 (3) EC-type-examination Certificate Number:

PTB 11 ATEX 2020 X

- (4) Equipment: e/p-positioner, type 3725-1100..
 (5) Manufacturer: SAMSON AG Mess- und Regeltechnik
 (6) Address: Weisullerstr. 3, 80314 Frankfurt, Germany
 (7) This equipment and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.

- (8) The Physikalisch-Technische Bundesanstalt, notified body No. 0102 in accordance with Article 6 of the Council Directive 94/9/EC of 23 November 1994, notified that the equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.
 The examination and test results are recorded in the confidential assessment and test report PTB Ex 11-21059.

- (9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:
EN 60079-0:2009
EN 60079-11:2007

- (10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

- (11) This EC-type-examination Certificate relates only to the design, examination and tests of the specified equipment in accordance to the Directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.

- (12) The marking of the equipment shall include the following:

 **II 2 G Ex ia IIC T4**

Zertifizierungsstelle

On behalf of PTB

Braunschweig, August 25, 2011



Dr.-Ing. U. Johann

Direktor und Professor

sheet 1/3

EC-type-examination Certificates without signature and official stamp shall not be valid. The certificates may be consulted only without alteration. Extracts or alterations are subject to approval by the Physikalisch-Technische Bundesanstalt. In case of dispute, the German text shall prevail.

SCHEDULE

- (13) **EC-TYPE-EXAMINATION CERTIFICATE PTB 11 ATEX 2020 X**

- (15) Description of equipment:

The e/p-positioner, type 3725-1100.., is a single-acting positioner intended for the installation onto pneumatic lift drives and slewing-motion actuators. It is used for the assignment of a valve position to an actuating signal. Non-flammable media serve as pneumatic auxiliary power.

The e/p-positioner, type 3725-1100.., is a passive two-terminal network which may be connected to all certified intrinsically safe circuits provided that the permissible maximum values for U_i , I_i and P_i are not exceeded.

The equipment is installed inside the hazardous area.

The permissible ambient temperature range is $-25\text{ }^{\circ}\text{C} \dots 80\text{ }^{\circ}\text{C}$.

Electrical data

Signal circuit type of protection Intrinsic Safety Ex ia IIC only for connection to a certified intrinsically safe circuit

Maximum values:

 $U_i = 28\text{ V}$
 $I_i = 115\text{ mA}$
 $P_i = 1\text{ W}$
 $C_i = 8,3\text{ nF}$
 L_i negligibly low

- (16) Assessment and test report PTB Ex 11-21059

- (17) Special conditions for safe use

The manufacturer, documentation and the operating instructions manual shall include all required information to restrict the risk of electrostatic charge to a minimum. A warning label shall be affixed to the equipment.

sheet 2/3

EC-type-examination Certificates without signature and official stamp shall not be valid. The certificates may be consulted only without alteration. Extracts or alterations are subject to approval by the Physikalisch-Technische Bundesanstalt. In case of dispute, the German text shall prevail.

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

SCHEDULE TO EC-TYPE-EXAMINATION CERTIFICATE PTB 11 ATEX 2020 X

(18) Essential health and safety requirements

met by compliance with the standards mentioned above

Zertifizierungssektor Explosionschutz
On behalf of PTB:

Dr.-Ing. U. Johannsmeyer
Direktor und Professor

Braunschweig, August 25, 2011



Samson AG
Mess- und Regeltechnik
Herrn Tomislav Varga
Weismüllerstraße 3
60314 Frankfurt



Offenbach, 2011-05-11

Ihr Zeichen
Tomislav Varga

Ansprechpartner
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PRÜFBERICHT
Information des Auftraggebers

Test Report for the Information of the applicant

Schutzartprüfung an SAMSON Stellungsregler
Typ 3725

Dieser Prüfbericht enthält das Ergebnis einer einmaligen Untersuchung an dem zur Prüfung vorgelegten Erzeugnis. Ein Muster dieses Erzeugnisses wurde geprüft, um die Übereinstimmung mit den nachfolgend aufgeführten Normen bzw. Abschnitten von Normen festzustellen. Die Prüfung wurde durchgeführt von 2011-01-10 bis 2011-05-09.

This test report contains the result of a singular investigation carried out on the product submitted. A sample of this product was tested to found the accordance with the thereafter listed standards or clauses of standards resp. The testing was carried out from 2011-01-10 to 2011-05-09.

Der Prüferbericht berechtigt Sie nicht zur Benutzung eines Zertifizierungszeichens des VDE und berücksichtigt ausschließlich die Anforderungen der unten genannten Regelwerke.

The test report does not entitle for the use of a VDE Certification Mark and considers solely the requirements of the specifications mentioned below.

Seite 2 - 11.05.2011 Unser Zeichen: 479000-9010-0001/144591
FG34/bhl-wah

Wenn gegenüber Dritten auf diesen Prüfbericht Bezug genommen wird, muss dieser Prüfbericht in voller Länge an gleicher Stelle verfügbar gemacht werden.

Whenever reference is made to this test report towards third party, this test report shall be made available on the very spot in full length.

1 Aufgabe

An dem unter Punkt 2 bezeichneten Prüfmuster wurde eine Prüfung auf Einhaltung der Schutzart IP66 durchgeführt.

2 Prüfmuster

SAMSON Stellungsreoler. Typ 3725



3 Beurteilungsgrundlage

DIN EN 60529 (VDE 0470 Teil 1):2000-09
Schutzarten durch Gehäuse (IP- Code)
Deutsche Fassung EN 60529:1991 + A1:2000

4 Durchführung der Prüfung

Die Staudruckprüfung erfolgte mit Absaugung gemäß Kategorie 1 über die Kabelverschraubung. Der Unterdruck betrug 2 kPa; die Prüfdzeit 8 Stunden.

Für das unter 2 beschriebene Prüfmuster wurde folgendes Ergebnis erzielt:

- Das Gehäuse des SAMSON Stellungsreglers erfüllt in der vorgestellten Ausführung die Anforderungen an die Schutzart IP66.

VDE Prüf- und Zertifizierungsinstitut GmbH
Fachgebiet FG34

I.A. *Pineta* I.A. *Bell*

[illegible]



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EB 8394 EN

2012-11-05